

AMENDMENTS TO THE CLAIMS

The following listing of claims replaces all prior versions, and listings, of claims in the captioned patent application:

1-17. (Canceled)

18. (Currently Amended) A cochlear prosthesis comprising:

a control unit that determines a pattern of electrical stimulation; and

an implanted stimulator unit operationally coupled to said control unit and comprising circuitry housed in a hermetic enclosure comprising a casing and a virtual wire assembly comprising:

a substantially electrically-nonconductive substrate hermetically sealed within an aperture of said casing; and

and having hermetic feedthroughs each comprising a doped conductive region in said substantially electrically-nonconductive substrate, wherein said doped conductive region extends transversely through said substantially electrically-nonconductive substrate to form a conductive pathway with accessible surfaces at opposing ends, and through which electrical stimulation channels are routed to provide electrical stimulation of auditory nerve cells.

19. (Currently Amended) The cochlear prosthesis of claim 18, ~~wherein said virtual wire assembly comprises:~~

~~— a substantially electrically-nonconductive substrate hermetically sealed within an aperture of said casing; and~~

~~said hermetic feedthroughs, wherein said hermetic feedthroughs each comprise a conductive region extending transversely through said substrate to form a conductive pathway with accessible surfaces at opposing ends thereof; wherein each said conductive pathway is electrically isolated from other said conductive pathways.~~

20. (Currently Amended) The cochlear prosthesis of claim 19, wherein said substantially electrically-nonconductive substrate is a semiconductor device.

21. (Currently Amended) The cochlear prosthesis claim 19, wherein said ~~doped~~ conductive regions each are comprised of an n-type or a p-type doped semiconductor material.

22. (Original) The cochlear prosthesis of claim 21, wherein said substrate is made of a material from the group consisting of silicon, germanium, and gallium arsenide.

23. (Previously Presented) The cochlear prosthesis of claim 19, wherein said virtual wire assembly further comprises electrical contacts disposed at opposing ends of said conductive pathways.

24. (Original) The cochlear prosthesis of claim 23, wherein each of said electrical contacts is a terminal for electrically connecting to a wire.

25. (Original) The cochlear prosthesis of claim 24, wherein each of said terminals is made of at least one material from the group consisting of gold; platinum; a eutectic alloy; and an intrinsically electrically conductive polymeric material.

26. (Original) The cochlear prosthesis of claim 24, wherein said electrical contact is configured to be attached to a wire.

27. (Canceled)

28. (Canceled)

29. (Currently Amended) An implantable medical device comprising:

circuitry; and

a hermetic enclosure in which said circuitry is housed, said hermetic enclosure comprising: a casing with an aperture; and a virtual wire assembly comprising:

~~a substantially electrically-nonconductive substrate hermetically sealed within said aperture of said casing, and; and~~

~~having hermetic feedthroughs each comprising a doped conductive region in said substantially electrically-nonconductive substrate, wherein said doped conductive region extends transversely through said substantially electrically-nonconductive substrate to form a conductive pathway with accessible surfaces at opposing ends, and through which electrical signals can be routed.~~

30. (Currently Amended) The implantable medical device of claim 29, ~~wherein said virtual wire assembly comprises:~~

~~— a substantially electrically-nonconductive substrate hermetically sealed within an aperture of said casing, and~~

~~said hermetic feedthroughs, wherein said hermetic feedthroughs each comprise a conductive region extending transversely through said substrate to form a conductive pathway with accessible surfaces at opposing ends thereof, wherein each said conductive pathway is electrically isolated from other said conductive pathways.~~

31. (Original) The implantable medical device of claim 30, wherein said substantially electrically-nonconductive substrate is a semiconductor device.

32. (Currently Amended) The implantable medical device claim 30, wherein said doped conductive regions each comprise of an n-type or a p-type doped semiconductor material.

33. (Currently Amended) The cochlear prosthesis of claim 26, wherein at least part of said wire is located in a groove in said doped ~~first~~ conductive region.

34. (Previously Presented) The cochlear prosthesis of claim 26, wherein at least part of said wire is located in a depression in said substrate.

35. (Previously Presented) The cochlear prosthesis of claim 34, wherein said electrical contact is secured in said depression using a cold weld.

36. (Previously Presented) The cochlear prosthesis of claim 34, wherein said electrical contact is secured in said depression using mechanical tension.

37. (Previously Presented) The cochlear prosthesis of claim 23, wherein said electrical contacts on at least one side of said substrate are in electrical communication with a ball grid array.

38. (Previously Presented) The cochlear prosthesis of claim 18, wherein said assembly is integrated into a casing defining a hermetic enclosure, wherein said hermetic enclosure contains circuitry electrically connected to said accessible surface of at least one of said conductive pathways, and wherein said accessible surface of each of said at least one conductive pathway is configured to be connected to an electrode lead.

39. (Previously Presented) The cochlear prosthesis of claim 18, wherein said device further comprises an additional substrate having a plurality of second conductive regions, wherein said additional substrate is adjacent to said substrate such that said second conductive regions being substantially aligned with said first conductive regions.

40. (Previously Presented) The cochlear prosthesis of claim 39, wherein said additional substrate is attached to said casing on one side and attached to a casing extension on an opposite side, and wherein said casing and casing extension are joined together.